

REMARKS

Reconsideration and allowance are respectfully requested.

Applicant appreciates the telephone interview granted by Examiner William McCalister to James Wray on October 13, 2010.

During that interview, it was agreed that a claim that included a description that the sealing ring could move in one radical direction or the other but could not expand in both radical direction at the same time distinguishes the claims from Applicant's own Voss reference.

An example is shown in Figures 3-5. It is believed that claim 15, the sole independent claim, does describe that feature as shown in Figures 3-5. Fluid flow and pressure from the consumer device proves the sealing ring toward the consumer device in normal operation, as shown in Figure 3. Over pressure forces the sealing ring outward away from the ports upon over pressure, protecting the sealing ring from abrasion.

Fluid flow and pressure from the chamber presses the sealing ring toward the consumer device is shown in Figure 5 during over pressure, sealing the damping chamber.

That is the feature that is described in the last four lines of claim 15 and that is the feature that is not shown in the prior art O rings in the Richard Voss patent.

A general description of O ring is attached.

The examiner compares two valves that cannot be compared. For the previous Richard Voss US 5,462,076 the "round" sealing ring is inserted by way of a mechanical pretension, which means it must already touch the bottom of the key seat 20 and the sealing face 37 at the time of installation. Figures 3 through 5 of the present patent application however show that the rectangular sealing ring is only pushed against the sealing face (Figure 3 and Figure 5) or pushed into the ceiling groove down to the bottom of the key seat (Figure 4) 37 by the pressure medium.

The sealing ring of the present invention, as described and claimed, is never pressed against both opposite sealing faces at the same time, as described in the Richard Voss cited patent.

The sealing ring is hydraulically placed into the respective working position and is held there and put under pressure by the high pressure of the pressure medium.

For the rest, US 5,462,076 does not have any damping chamber 45, so that the position shown in Figure 5 of the application (sealing of the damping chamber) is not realized in the prior art.

The inventor, Mr. Wolfgang Voss has reported that an entire face support using the new Wolfgang Voss valves of the present invention has been successfully used in the USA for three years. Other valves - including others by the referenced Richard Voss - achieve utilization time frames of one year or less.

A distinguishing feature, as described and claimed herein, is that the seal is pressed against only one of the opposite sealing faces and is not squeezed at the same time between the opposing sealing faces in the groove and on the cylindrical face.

All of the claims have that feature, and all of the claims should be allowed.

Claims 15 and 18-21 are not anticipated by Voss and therefore are patentable under 35

U.S.C. 102(b) over Voss (U.S. Patent 5,462,076).

O-ring 27 and groove 32 in FIG. 1 of Voss have been cited. Voss does not have:

a non pre-tensioned seal ring with limited flexibility disposed in the groove without pre-stressing, the seal ring having a first side facing the consumer connection, a second side opposite the first side away from the consumer connection, top and bottom opposite sides between the first side and the second side, the groove having a shape for allowing partial or total flow of the pressurized fluid into the groove and around the seal ring, and wherein the seal ring is displaceable towards the consumer connection due to flow of the pressurized fluid on sides of the seal ring including the second side away from the consumer connection.

The O ring 27 used in Voss entirely differs from the seal 6, 12 used in the present invention.

Voss' O-ring 27 must be stretched and pre tensioned. The present seal is simply placed in the groove.

Voss' O-ring 26 functions by deforming against one of the end walls of Voss groove 32 and deforms to prevent passage of fluid. That is the way an O-ring functions.

The present invention as claim seal functions as described and claimed. When the high hat 28 is lifted by over pressurized fluid in blind hole 17, the seal and groove operate by "... allowing partial or total flow of the pressurized fluid into the groove 13 and around the seal ring 6, 12." In contrast, Voss' "... main piston 24 and the spring piston 29 ... both are constructed to ride over an O-ring 27 or a sealing ring 30." See Voss Col. 5, lines 52-54.

Voss' O ring is not displaceable toward the consumer connection as claimed in claim 1.

Voss does not have every feature as claimed. Voss cannot anticipate the present invention as claimed in claim 1.

Claim 18 adds to claim 1 that the seal and groove are in the movable closure, which is not found in Voss.

Claim 19 adds that the seal and groove partially extend into opening cross sections and connection bores, which is not found in Voss.

Claim 21 adds to claims 19 and 20 that the connection bores are at a proximal end of the blind hole. That is not found in Voss, where the radial bores 26 are in the main piston 26. See Voss FIG. 1 and Col. 5 line 13.

The subject matter of claims 18-21 could not have been anticipated by Voss.

The present invention, as defined in claim 15, is a unique pressure limiting valve device for protecting hydraulic pressure packs against an overload and hydraulic props against falling rocks in underground mining and tunnel construction. The valve device comprises pressure limiting valve which includes a valve housing and a consumer connection coupled to the valve housing. A pressurized fluid outlet in the consumer connection allows flow of pressurized fluid. A movable closure separates the pressurized fluid outlet and the consumer connection, a flow gap is between the pressurized fluid outlet and the consumer connection, and a valve spring in the valve housing exerts force such that the movable closure is movable against the force exerted. An inventive seal on the movable closure secures the flow gap with the valve housing and the consumer connection remaining connected when the overload occurs for discharging the pressurized fluid. The seal comprises a groove and a seal ring with limited flexibility disposed in the groove without pre-stressing. The seal ring has a side facing the connection, a second side opposite the first side, top side and bottom opposite sides between the first side and the second side. The groove has a unique shape for allowing partial or total flow of the pressurized fluid into the groove and around the seal ring, such that the seal ring is displaceable towards the connection due to flow of the pressurized fluid on sides of the seal ring including the second side away from the first side. Dependent claims add further patentable features to claim 15.

Applicant's own prior patent, Voss, relates to pressure limiting valves designed to neutralize back pressure by releasing pressure medium in the return line when overload occurs. Nothing in Voss describes, teaches, suggests or remotely hints at the sealing ring 30, 27 being pressurized by the highly pressurized water or water-oil mixture so that it is pressed on to the piston 29 or 24.

Contrary to the Examiner's holding, Voss expressly requires a pair of O-rings having different hardness. The O-ring forming a "soft" sealing ring passes the spring piston and the O-ring with greater hardness passes by the pressure medium. Thus, Voss expressly teaches that the harder O-ring is required so that it remains unaffected by the pressure medium. Given that express teaching, Voss does not even remotely hint at a seal ring which is displaceable due the flow of the pressurized medium on sides of the seal ring. Moreover, Voss relates to an O-ring and not a seal ring having the claimed sides.

As pointed out in the present specification (pages 1-2) the O-rings deform causing the hydraulic pressure occurring in the groove or acting in the groove to act in the direction of the flow gap which is exactly the problem addressed by and resolved by the present invention. The claimed device avoids the wear and tear that is a constant problem dogging existing O-rings.

Voss expressly teaches that the sealing ring 12 ensures that the valve bore 11 or exit-entrance 15 can be sealed against other bores arranged in guide 9 thereby teaching away from the claimed flow gap and pressurized fluid outlet connection. Also, Voss mandates that the pressure medium be discharged via blind bore 25 and radial bores 26 into the water chamber 18 when the main piston is slid over the O-ring 27, which again teaches away from the claimed invention.

In fact, on page 11, the Examiner admits that "Voss does not teach the claimed seal" and, yet, deems Voss to teach the claimed features. To be anticipating, a prior art reference must disclose "each and every limitation of the claimed invention[,],... must be enabling[,], and must describe...[the] claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention." *In re Paulsen*, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994).

Therefore, lacking each and every claim limitation, Voss cannot anticipate or render obvious the claimed invention. Claims 15 and 18-21 are patentable over Voss under 35 U.S.C. 102(b).

The subject matter of claims 15, 18-21, 26, and 27 would not have been obvious from Voss. Claims 15, 18-21, 26 and 27 are patentable under 35 U.S.C. 103(a) over Voss (U.S. Patent 5,462,076).

Voss has two pistons, “the main piston 24 and the spring piston 29.” See Voss FIG. 1 and column 5 lines 24-25. Voss states directly, “... the main piston 24 ... is sealed by an O-ring 27, and a spring piston that itself must be sealed effectively by a sealing ring 30.” See Col. 5 lines 12-15. Throughout Voss states “... sliding the main piston over the O ring ...” Col. 5 line 21.

Nothing in Voss would have rendered obvious the structure and its operation as described in claim 15 with “the groove having a shape for allowing partial or total flow of the pressurized fluid into the groove and around the seal ring”, for example, as specifically set forth in claim 15.

Nothing in Voss would have rendered obvious “wherein the seal ring is displaceable towards the consumer connection due to flow of the pressurized fluid on ... the second [inner] side away from the consumer connection” in claim 15.

Claims 18-21 point out features not found in Voss and not obvious from Voss, as stated in detail above.

Claims 26 and 27 additionally point out the seal is made of plastic and specifically polyamide. That can not be made obvious by Voss’ hardness. Voss is silent as to composition.

Nothing in Voss would have made the obvious new subject matter of claims 15, 18-21, 26 and 27.

As pointed out above Voss does not teach or suggest the claimed invention.

The present invention, as defined in claim 15, is a unique pressure limiting valve device for protecting hydraulic pressure packs against an overload and hydraulic props against falling rocks in underground mining and tunnel construction. The valve device comprises pressure limiting valve which includes a valve housing, a consumer connection coupled to the valve housing, a pressurized fluid outlet in the consumer connection for allowing flow of pressurized fluid. A movable closure separates the pressurized fluid outlet and the consumer connection, a flow gap is between the pressurized fluid outlet and the consumer connection, and a valve spring in the valve housing exerts force such that the movable closure is movable against the force exerted. An inventive seal on the movable closure secures the flow gap with the valve housing and the consumer connection remaining connected when the overload occurs for discharging the pressurized fluid. The seal comprises a groove and a seal ring with limited flexibility disposed in the groove without pre-stressing. The seal ring has a side facing the connection, a second side opposite the first side, top side and bottom opposite sides between the first side and the second side. The groove has a unique shape for allowing partial or total flow of the pressurized fluid into the groove and around the seal ring, such that the seal ring is displaceable towards the connection due to flow of the pressurized fluid on sides of the seal ring including the second side away from the first side. Dependent claims add further patentable features to claim 15.

Applicant's own prior patent, Voss, relates to pressure limiting valves designed to neutralize back pressure by releasing pressure medium in the return line when overload occurs. Nothing in Voss describes, teaches, suggests or remotely hints at the sealing ring 30, 27 being pressurized by the highly pressurized water or water-oil mixture so that it is pressed on to the piston 29 or 24.

Contrary to the Examiner's holding, Voss expressly requires a pair of O-rings having different hardness with the O-ring forming a "soft" sealing ring passes the sprign piston and the O-ring with greater hardness paases by the pressure medium. Thus, Voss expressly teaches that the harder O-ring is required so that it remains unaffected by the pressure medium. Given that express teaching, Voss does not even remotely hint at a seal ring which is displaceable due the flow of the pressurized medium on sides of the seal ring. Moreover, Voss relates to an O-ring and not a seal ring having the claimed sides.

As pointed out in the present specification (pages 1-2) the O-rings deform causing the hydraulic pressure occurring in the groove or acting in the groove to act in the direction of the flow gap which is exactly the problem addressed by and resolved by the present invention. The claimed device avoids the wear and tear that is a constant problem dogging existing O-rings.

Voss expressly teaches that the sealing ring 12 ensures tha the valve bore 11 or exit-entrance 15 can be sealed against other bores arranged in guide 9 thereby teaching away from the claimed flow gap and pressurized fluid outlet connection. Also, Voss mandates that the pressure medium be discharged via blind bore 25 and radial bores 26 into the water chamber 18 when the main piston is slid over the O-ring 27, which again teaches away from the claimed invention of flowing the medium into the groove and displacing the sealing ring.

Therefore, Voss cannot render obvious the claimed invention. Claims 15, 18-21, 26 and 27 are patentable over Voss under 35 U.S.C. 103(a).

The subject matter of claims 16 and 17 would not have been obvious from any combination of Voss and Farley. Claims 16 and 17 are patentable under 35 U.S.C. 103(a) over Voss (U.S. Patent 5,462,076) in view of Farley (U.S. Patent 5,695,197).

Neither Voss nor Farley has the structure and operation of combined claims 15 and 16 or 15, 16 and 17. Neither would have suggested a groove with a shape to allow flow of pressurized fluid in back of the second inner side of the ring to press the seal against a fixed surface as the seal and groove slide.

Claims 15-16 and 15-16-17 are not obvious and are patentable.

As pointed out above Voss does not teach or suggest the claimed invention. Therefore, any further combination with other references will also lead away from the present claims.

Farley has been relied on for a seal ring. However, the Farley sealing ring is firmly attached to the support plate 22 and positioned to move with the plate. Nothing in Farley, describes, teaches or suggests that the pressure medium moves the sealing ring as uniquely done by the present invention.

Farley seeks to form a seal ring 12 with better deformation properties by adding substances to PTFE. Farley has nothing to do with a seal ring that is movable by the pressure medium flowing into the groove holding the seal ring. Moreover, Farley cannot be combined with Voss as the latter mandates the specific O-rings for that device to work. The two references do not teach a combination as proposed by the Examiner nor can they be combined without harming the Voss teachings and device.

Claims 16 and 17 are patentable under 35 U.S.C. 103(a) over Voss and Farley.

The subject matter of claims 22, 24, and 25 would not have been obvious from a combination of Voss, Farley and Albertson. The claims are patentable under 35 U.S.C. 103(a) over Voss (U.S. Patent 5,462,076) in view of Farley (U.S. Patent 5,695,197) and further in view of in view of Albertson (US Patent 6,290,235).

Voss and Farley have been discussed above. Albertson does not add anything of significance to either Voss or Farley. Albertson is primarily concerned with two paired seals, which are neither in Voss nor Farley, nor the present invention. Albertson does not place a seal in a movable member and always holds the seals in compression between inner and outer walls. That would have lead away from the present invention. The Albertson secondary seal has a valving portion which would have lead away from Voss, Farley and the present invention.

Claims 22, 24 and 25 specifically add to claim 15 the specific shape of the groove, which would not have been obvious from any of the three references.

Claims 22, 24, and 25 are patentable.

As pointed out above Voss and Farley do not teach or suggest the claimed invention. Therefore, any further combination with other references will also lead away from the present claims.

The Examiner relies on Albertson to fill the gap inVoss.

Albertson relates to a sealing system with first and second seal members, with the first member having spaced apart first upper and lower end faces disposed in respective glands. The Examiner relies on element 202b as being a beveled funnel-type partition “along a first side and base to accommodate a square seal 140.” However, Voss expressly mandates the pair of O-rings with specific hardness for his invention to work rather than any other shaped sealing ring. The modification proposed by the Examiner will do harm to the express teaching and the device of

Voss. Thus, the two references cannot be combined in the manner proposed by the Examiner. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

Claims 22, 24, and 25 are patentable under 35 U.S.C. 103(a) over Voss, Farley and Albertson.

The subject matter of claims 15 and 28-33 would not have been obvious from a combination of Voss and de Launay. Claims 15 and 28-33 are patentable under 35 U.S.C. 103(a) over Voss (U.S. Patent 5,462,076) in view of de Launay (U.S. Patent 4,176,680).

Voss has been described previously. De Launay has an in line check valve with a plug 46 and point 54 that allows flow 18 to lift the plug and attach cup sufficiently to allow flow. De Launay does not suggest combination with Voss and there appears to be no common or commonly useable features between the two references.

Claims 15 and 28-33 would not have been obvious from any possible combination of Voss and de Launay. The features discussed above that distinguish the invention from Voss would not have been found in de Launay.

Dependent claims 28-33 further distinguish the references. There is no connection (claims 28, 30), type nipple or piston-type attachment (claims 28, 30) on a movable closure of de Launay.

There is no flow gap (claim 29) in de Launay or top hat (claim 31) in de Launay, no sharp edges of a seal ring (claim 32) in de Launay and no spring disc top hat in de Launay.

Claims 15 and 28-33 are patentable.

The present invention, as defined in claim 15, is a unique pressure limiting valve device for protecting hydraulic pressure packs against an overload and hydraulic props against falling rocks in underground mining and tunnel construction. The valve device comprises pressure limiting valve which includes a valve housing, a consumer connection coupled to the valve housing, a pressurized fluid outlet in the consumer connection for allowing flow of pressurized fluid. A movable closure separates the pressurized fluid outlet and the consumer connection, a flow gap is between the pressurized fluid outlet and the consumer connection, and a valve spring in the valve housing exerts force such that the movable closure is movable against the force exerted. An inventive seal on the movable closure secures the flow gap with the valve housing and the consumer connection remaining connected when the overload occurs for discharging the pressurized fluid. The seal comprises a groove and a seal ring with limited flexibility disposed in the groove without pre-stressing. The seal ring has a side facing the connection, a second side opposite the first side, top side and bottom opposite sides between the first side and the second side. The groove has a unique shape for allowing partial or total flow of the pressurized fluid into the groove and around the seal ring, such that the seal ring is displaceable towards the connection due to flow of the pressurized fluid on sides of the seal ring including the second side away from the first side. Dependent claims add further patentable features to claim 15.

Nothing in the references of record describes, teaches or suggests those claimed features.

In fact, the Examiner admits that “Voss does not teach the claimed seal” and relies on de Launay to fill that gap in Voss.

De Launay relates to a check valve in a fluid flow line in which during the opening pressure the fluid passes by the sealing ring (resulting in a leaking valve). In de Launay, the

fluid cannot enter the groove and flow around the sealing ring to displace the ring against the closure. The pressure of the spring presses the sealing ring onto the sealing surface and there is no displacement of the ring by the flow. Moreover, de Launay has nothing to do with a pressure limiting valve. The so-called ring 56 does not and cannot be in a sealing position caused by the pressurized medium as uniquely done by the present invention.

Thus, Voss and de Launay do not describe, teach, or suggest the claimed invention. Since claim 15 is patentable claims 28-33 dependent thereon are also patentable over the references of record.

CONCLUSION

Reconsideration and allowance of all claims are requested.

Respectfully,

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